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An interferometric method and apparatus for in-situ monitoring of a thin film thickness and of etch and deposition rates using a pulsed flash lamp providing a high instantaneous power pulse and having a wide spectral width. The optical path between the flash lamp and a spectrograph used for detecting light reflected from a wafer is substantially transmissive to the ultraviolet range of the spectrum making available to the software algorithms operable to calculate film thickness and etch and deposition rates desirable wavelengths.